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Soil moisture measurement.—The water content of the soil has long been recognized as the most important edaphic factor in limiting the occurrence and permanence of plant associations, but it has always been difficult to measure such a factor in terms that could be related to plant production. CRUMP,[17] in his studies of the vegetation of peat soils, has devised a method of expressing the relative humidity of these soils in such a manner that a definite index of water as an ecological factor is obtained. This index he has termed the "coefficient of humidity," and it seems, for the habitats studied, to be a constant whose value may be determined for any given plant association. In obtaining this constant, the amount of water present in any soil is expressed in terms of percentage of the dry weight at 15° C., and the humus-content being determined in the usual way by combustion, the ratio of the water-content is obtained in terms of the humus-content as follows:

$$\frac{\text{water-content}}{\text{humus-content}} = \text{coefficient of humidity}$$

This coefficient is shown to vary directly with the amount of water available for the use of the vegetation of a habitat, and the investigator believes it to be a true integration of the relative humidity of the soil of different areas. He admits, however, that his methods will not apply to sandy soils with small humus-content, and probably not to many clays, although he has devised a correction which permits it to be used for sub-peats containing large amounts of sand.

Applying this unit of measurement to certain moor plant associations, he finds[18] that the mean coefficients of humidity for the *Eriophorum* moor, the *Calluna* moor, and the *Molinia* moor of the Southern Pennines to be respectively 6, 3.3, and 2; and thus he is able to institute a direct comparison between the water conditions of these associations and others in the same formation.

It would seem that as the result of these investigations the ecologist has been given a most important method of expressing soil moisture, far in advance of anything before available, and it is to be hoped that it will be found to be applicable to a great variety of soils.—GEO. D. FULLER.

Chromosomes in Allium.—In the nuclei of *Allium Cepa* BONNEVIE[19] has described a large chromatin knot from which the chromatin threads radiate. In the presynaptic stages in the pollen mother cells these threads become paired. From a comparison with the origin and behavior of similar radial threads in the somatic divisions, the conclusion is drawn that this process represents a side-by-side conjugation of somatic chromosomes, which are separated at the first maturation division.

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[17] CRUMP, W. B., The coefficient of humidity: a new method of expressing the soil moisture. New Phytol. **12**:125–147. 1913.

[18] CRUMP, W. B., Notes on water content and the wilting point. Jour. Ecol. **1**:96–100. 1913.

[19] BONNEVIE, K., Chromosomenstudien. III. Chromatinreifung in *Allium Cepa* (♂). Arch. f. Zellforschung **6**:190–253. *pls. 10–13.* 1911.

MOTTIER and NOTHNAGEL,[20] after a study of the pollen mother cells of *Allium cernuum*, come to very different conclusions regarding the conjugation process. These stand in agreement with the earlier accounts of MOTTIER, and may be summarized as follows. Synapsis is a real contraction of the linin net with its chromatin granules. The thick spirem which emerges therefrom shows only an occasional temporary split in some parts. Nothing is found to indicate a union of two spirems in the prophases. During a second contraction the spirem is thrown into loops, and cross-segmentation occurs. The bivalent chromosomes so formed are regarded as consisting of two somatic chromosomes previously arranged end to end in the spirem. The members of each bivalent separate at the first division and during anaphase become longitudinally split in preparation for the second. At telophase there is formed an interrupted spirem, but there is present no chromatin knot such as BONNEVIE has described and which MOTTIER and NOTHNAGEL believe to be due to improper fixation.

The above works recall the earlier researches of BERGHS[21] and of GRÉGOIRE[22] on *Allium fistulosum*, in which they found the bivalent chromosomes arising through a union of two spirems in the presynaptic or synaptic stages, as BONNEVIE later found in *Allium Cepa*. The figures given by these writers to illustrate these critical stages form a much more complete series than those accompanying the contribution of MOTTIER and NOTHNAGEL. It is hardly probable that the disagreement between these accounts is due entirely to the fact that different species of *Allium* were used.—L. W. SHARP.

Cytology of mutants.—Some of the cytological aspects of the *Oenothera* question are summarized by GATES[23] in a discussion of tetraploid mutants. *O. gigas*, a tetraploid form, in all probability arises through the apogamous development of an unreduced megaspore mother cell with 28 chromosomes ($4x$), such a cell having been seen by GEERTS. Triploid mutants seem to be due to the union of a diploid with a haploid germ cell (STOMPS, Miss LUTZ). In some plants the mutational changes are not confined to the meiotic divisions, but at

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[20] MOTTIER, D. M., and NOTHNAGEL, M., The development and behavior of the chromosomes in the first or heterotypic mitosis of the pollen mother cells of *Allium cernuum* Roth. Bull. Torr. Bot. Club **40**:555–565. *pls. 23, 24.* 1913.

[21] BERGHS, J., La formation des chromosomes hétérotypiques dans la sporogénèse végétale. II. Depuis la sporogonie jusqu'au spirèm définitif dans la microsporogénèse de l'*Allium fistulosum*. La Cellule **21**:383–394. *pl. 1.* 1904.

[22] GRÉGOIRE, V., La formation des gemini hétérotypiques dans les végétaux. La Cellule **24**:369–420. *pls. 2.* 1907.

[23] GATES, R. R., Tetraploid mutants and chromosome mechanisms. Biol. Centralbl. **33**:93–99, 113–150. *figs. 7.* 1913.